



## DESCRIPTION

PANTS-TYPE DISPOSABLE DIAPER AND  
PROCESS FOR ITS PRODUCTION5 BACKGROUND ART~~TECHNICAL FIELD~~

The present invention relates to a pants-type disposable diaper and a process for its production.

BACKGROUND ART

10 There have been known so far pants-type disposable  
diapers (hereinafter referred to as the pants-type  
diaper(s)), each comprising a diaper main body having  
a front abdomen portion, a back portion, and leg hole  
sections which are formed on both sides of a crotch  
15 portion between these portions, and further having a  
waist opening which is formed by joining each of both  
side edges of the front abdomen portion to corresponding  
each one of both side edges of the back portion, in which  
waist elastic members are attached in an expanded state  
20 to parts of the front abdomen portion and to parts of  
the back portion, both of which parts are corresponding  
to the waist opening, with each of the leg hole sections  
being provided with a leg-hole elastic member which is  
attached in an expanded state along the leg holes.

25 With respect to the pants-type diapers of this kind,

since the diaper main body is kept in a shrunk state by the elastic forces of the waist elastic members and the leg-hole elastic members, it has been difficult to recognize identification information including the  
5 size and the front or back side of the diaper main body, and the like, when the wearer puts on the diaper. Thus, there have been known pants-type diapers which make it possible to recognize the identification information in wearing the diaper, as disclosed in, for example,  
10 Japanese Patent Laid-Open Publication No. 10-298801 and Japanese Patent Laid-Open Publication No. 2000-266.

The pants-type diaper disclosed in Japanese Patent Laid-Open Publication No. 10-298801 is provided with characters attached to the inside of the waist opening,  
15 which makes it possible to recognize the front or back side of the diaper, whereas the pants-type diaper disclosed in Japanese Patent Laid-Open Publication No. 2000-266 is provided with patterns printed on the back portion of the diaper main body.

20 In wearing the pants-type diaper disclosed in the above-identified first patent document, the wearer is allowed to confirm the characters attached to the inside of the waist opening when the waist opening is widened, and can therefore recognize the front or back side of  
25 the pants-type diaper. On the other hand, in wearing

the pants-type diaper disclosed in the above-identified second patent document, the wearer is allowed to recognize the side bearing the printed patterns as the rear side of the diaper main body by confirming the front or back side of the diaper main body, and can therefore  
5 recognize the front or back side of the pants-type diaper.

In the nursing-care facilities and the like, in which pants-type diapers of two or more kinds are daily  
10 used, two or more pants-type diapers, which have been taken out of their packaging bags, may often be stacked on one another and stored so as to be promptly used. In the case when the pants-type diapers disclosed in the above-identified first patent document are stored  
15 in a stacked state, in order to recognize identification information including the size and the front or back side of each of the diapers, and the like, it requires time-consuming and complicated work, for example, taking out a specific one from the stacked pants-type  
20 diapers and then expanding the waist opening of the pants-type diaper. In the case when the pants-type diapers disclosed in the second patent document are stacked on one another and stored, since the patterns printed on the back portion thereof is hidden by other  
25 pants-type diapers stacked thereon, it also requires

time-consuming and complicated work, for example, taking out a specific one from the stacked pants-type diapers and then confirming the front or back side of this pants-type diaper, in order to recognize the  
5 identification information.

The present invention has been completed ~~so as to~~ solve the above-described problems, and an objective of the present invention is to provide a pants-type disposable diaper which enables easy recognition of  
10 identification information including the size and the front or back side of each of the diapers, and the like, even when these diapers are placed in a stacked state, and a process for producing such a diaper.

15 ~~DISCLOSURE OF THE INVENTION~~ SUMMARY OF THE INVENTION

In order to solve the above-described problems, the present invention provides a pants-type disposable diaper comprising a diaper main body having a front abdomen portion, a back portion, and leg hole sections  
20 which are formed on both sides of a crotch portion between ~~these portions~~ the front abdomen portion and the back portion, and ~~further having~~ a waist opening which is formed by joining each of both side edges of the front abdomen portion to corresponding each one of both side  
25 edges of the back portion, wherein the diaper main body

~~is with the crotch portion being provided with an~~  
absorbent main body at the crotch portion, ~~in which waist~~  
elastic members are attached in an expanded state in  
a diaper width direction to ~~parts of the front abdomen~~  
5 ~~portion and to parts of the back portion, both of which~~  
~~parts are corresponding to~~ along the waist opening, ~~with~~  
~~each of the leg hole sections being provided with a~~  
leg-hole elastic member ~~which is attached in an expanded~~  
state to the leg hole section along each of the leg hole,  
10 ~~wherein the diaper main body is provided with a display~~  
part which displays identification information  
including the size of the diaper main body and the front  
or back side of the diaper main body, ~~and the like, so~~  
as to allow the display part to ~~become recognizable~~ be  
15 visible from a side position of each of the diaper main  
bodies, when two or more diaper main bodies are stacked  
on one another ~~with~~ so that the front abdomen portion  
of one diaper main body ~~being~~ is overlapped with the  
back portion of another diaper main body.

20       According to the present invention, in the case  
when two or more pants-type disposable diapers are  
stacked on one another, since the display part can be  
confirmed from a side portion of each of the diaper main  
bodies of the pants-type diapers, the size and the front  
25 or back side of each of the diaper main bodies can be

recognized in such a state that the respective diaper main bodies are stacked on one another. Moreover, when the display part of the present invention is confirmed in wearing a diaper, the wearer can appropriately wear  
5 the pants-type diaper without erroneously recognizing the size and the front or back side of the diaper main body.

In the above-described pants-type disposable diaper, the diaper main body is formed by turning up  
10 a sheet connecting the front abdomen portion and the back portion at a position corresponding to the crotch portion, and the display part may be preferably placed the outside part of the folded crotch portion.

In the above-described pants-type disposable  
15 diaper, the display part may be formed in any of the preferred embodiments: in which it is extended over both the front abdomen portion and the back portion; in which it is extended toward the front abdomen portion; and in which it is extended toward the back portion.

20 In the above-described pants-type disposable diaper, the leg-hole elastic members may be preferably attached and placed at the position except for a part corresponding to a formation position of the display part.

25 In the above-described pants-type disposable

diaper, the display part may be preferably formed on the folded outside part of the diaper main body which has been folded into an approximately square or rectangular shape in a plan view.

- 5       In the above-described pants-type disposable diaper, the identification information may be preferably printed on the diaper main body by means of an ink-jet system.

The process of the present invention, which is a  
10   process for producing a pants-type disposable diaper in which a diaper main body is formed by turning up a sheet constituting a front abdomen portion and a back portion at a position corresponding to a crotch portion, comprises the steps of:

- 15       feeding a continuous sheet composed of the two or more sheets, which are joined to each other in parallel to a turn-up line thereof, in a direction parallel to the turn-up line thereof;

opening positions corresponding to leg-hole  
20   sections of the continuous sheet; and

intermittently printing identification  
information including the size and the front or back  
side of the diaper main body, and the like, on a position  
which is placed on the outside of the sheet having  
25   openings in turning up of the sheet in the vicinity of

the turn-up line thereof, by means of an ink-jet system.

According to the process for producing a pants-type disposable diaper of the present invention, since the display parts are intermittently printed on the sheets  
5 having openings as leg-hole sections by means of an ink-jet system, it becomes possible to reduce the amount of ink required for printing at positions on the continuous sheet corresponding to the leg-hole sections, resulting in a reduction in the costs of the pants-type  
10 diaper, in comparison with the case where display parts are continuously printed along the turn-up line on a continuous sheet without openings as leg-hole sections, followed by opening the leg-hole sections.

15 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a pants-type disposable diaper according to one embodiment of the present invention.

FIG. 2 is a sectional view taken along line II-II  
20 of FIG. 1.

FIG. 3 is a perspective view showing a state after the diaper main body of FIG. 1 has been assembled.

FIG. 4 is a plan view showing a producing process of the pants-type disposable diaper of FIG. 1.

25 FIG. 5 is a schematic side view showing a processing



apparatus used for the producing process in FIG. 4.

FIG. 6 is a sectional view taken along line VI-VI of FIG. 1.

FIG. 7 is a front view that shows a diaper main body on which a display part has been formed according to another embodiment.

FIG. 8 is a plan view showing a folding process of a diaper main body ~~when placed into a packaging bag~~ for placement in a packaging bag; FIG. 8(a) shows a state prior to the folding process; FIG. 8(b) shows a state in which both side edges have been folded; and FIG. 8(c) shows a state in which a lower edge has been folded.

FIG. 9 is a plan view showing a folding process of a diaper main body ~~when placed into a packaging bag~~ for placement in a packaging bag; FIG. 9(a) shows state in which both side edges have been folded; FIG. 9(b) shows a state in which a lower edge has been folded; and FIG. 9(c) shows a state in which the lower edge is further folded.

FIG. 10 is a perspective view showing a display part formed on a diaper main body which has been folded; FIG. 10(a) shows the diaper main body which has been folded as shown in FIG. 8; and FIG. 10(b) shows the diaper main body which has been folded as shown in FIG. 9.

FIG. 11 is a perspective view showing a state in

which diaper main bodies, with display parts being respectively formed thereon, are stacked on one another, according to still another embodiment.

5 ~~BEST MODE FOR CARRYING OUT THE INVENTION~~ DESCRIPTION OF  
THE PREFERRED EMBODIMENTS

~~—— A pants-type disposable diaper according to the present invention is a pants-type disposable diaper comprising a diaper main body having a front abdomen~~  
10 ~~portion, a back portion, and leg hole sections which are formed on both sides of a crotch portion between these portions, and further having a waist opening which is formed by joining each of both side edges of the front abdomen portion to corresponding each one of both side~~  
15 ~~edges of the back portion, with the crotch portion being provided with an absorbing main body, in which waist elastic members are attached in an expanded state in a diaper width direction to parts of the front abdomen portion and to parts of the back portion, both of which~~  
20 ~~parts are corresponding to the waist opening, with each of the leg hole sections being provided with a leg hole elastic member which is attached in an expanded state along each of the leg holes, wherein the diaper main body is provided with a display part which displays~~  
25 ~~identification information the size and the front or~~

~~back side of the diaper main body, and the like, so as to allow the display part to become recognizable from a side position of each of diaper main bodies, when two or more diaper main bodies are stacked on one another, with the front abdomen portion of one diaper main body being overlapped with the back portion of another diaper main body.~~

~~—— In the above-described pants-type disposable diaper, the diaper main body is formed by turning up a sheet connecting the front abdomen portion and the back portion at a position corresponding to the crotch portion, and the display part may preferably be formed on the outside part of the turned-up sheet.~~

~~—— In the above-described pants-type disposable diaper, the display part may be formed in any of the preferred embodiments: in which it is extended over both the front abdomen portion and the back portion; in which it is extended toward the front abdomen portion; and in which it is extended toward the back portion.~~

~~20 —— In the above-described pants-type disposable diaper, no elastic members for leg holes may preferably be attached to a part corresponding to a formation position of the display part in a length direction of the diaper main body.~~

~~25 —— In the above-described pants-type disposable~~

~~diaper, the display part may preferably be formed on the folded outside part of the diaper main body which has been folded so as to be placed in a packaging bag.~~

~~In the above-described pants-type disposable~~  
5 ~~diaper, the display part may preferably be printed on the diaper main body by means of an ink-jet system.~~

The preferred embodiments will hereinafter be described in detail by reference to the drawings.

As shown in FIG. 1, a pants-type disposable diaper  
10 1 is basically formed by a diaper main body 2 and an absorbent main body 3.

The diaper main body 2, as shown in FIGS. 1 and 2, is provided with an inner sheet (wearer's skin side) 4 in which leg-hole sections S are formed on both sides  
15 of a crotch portion R between a front abdomen portion P and a back portion Q, and an outer sheet (outer face side) 5 (both of which are corresponding to a sheet). On waist sections of the front abdomen portion P and the back portion Q between the inner sheet 4 and the  
20 outer sheet 5, two or more waist elastic members 6 are attached and placed in an extended state in a diaper width direction W with narrow intervals in a diaper length (front-to-rear) direction X, while on body sections, two or more body-fitting elastic members 7  
25 are attached and placed in an extended state in a diaper

width direction W with wide intervals in a diaper length direction X.

Moreover, on each of the leg-hole sections S, two or more leg-hole elastic members 8 are attached and placed in an extended state along the leg hole between the inner sheet 4 and the outer sheet 5. These leg-hole elastic members 8 are attached and placed at positions except for an approximately center position (a part corresponding to the formation position of a display part 20, which will be described later) of the crotch portion R in the diaper length direction X.

The inner sheet 4 and the outer sheet 5 are bonded to each other by a hot-melt adhesive or the like, with the respective elastic members 6 to 8 being sandwiched therebetween. In addition, a margin portion 5a elongated in the diaper length direction X on each of both ends of the external sheet 5 is bent over in a manner so as to wrap the corresponding each one of both ends of the inner sheet 4, and is bonded to the corresponding each one of both ends of the inner sheet 4 (see Fig. 2).

The diaper main body 2, as will be described later in detail, is turned up in a manner so as to overlap the front abdomen portion P with the back portion Q with the inner sheet 4 located inside thereof so that each of side edges 1a of the front abdomen portion P is joined

to corresponding each one of side edges 1a of the back portion Q. At this time, the diaper main body 2 is turned up at an approximately center position of the crotch portion R in the diaper length direction X, and a display  
5 part 20 is formed on a part on the outside of the turning-up position, that is, on the outer sheet 5, as shown in Fig. 3.

On the display part 20, in the present embodiment, characters "M" which indicate the size of the diaper  
10 main body 2 (size M: one example of identification information) are aligned in one row along the diaper width direction W on the display part 20, and these characters "M" are printed in a direction so as to be read in the case when the diaper main bodies 2 are placed  
15 with the front abdomen portion P facing up.

In the case when the above-described diaper main bodies 2 are produced in a laterally flowing state in the diaper width direction W, as shown in Fig. 4, a continuous sheet 21 of the diaper main body 2 on which  
20 the display part 20 has been formed is turned up along a turn-up line A (that is, the center line of the crotch portion R) so that waist sections of the front abdomen portion P and the back portion Q are position-adjusted; thus, after the front abdomen portion P and the back  
25 portion Q have been joined to each other at their side

edges 1a by thermal fusing or the like, the sheet is then cut into individual diaper main bodies 2 along the cut line B. In this manner, a diaper main body 2 with waist openings is assembled by joining both  
5 corresponding edges 1a, 1a to each other.

As described above, in the case when the continuous sheet 21 in which each of the inner sheets 4 and each of the outer sheets 5 are connected to one another in parallel to the turn-up line A is processed through the  
10 laterally flowing process, ~~more specifically, in which~~ a processing apparatus 22, ~~as shown in Fig. 5,~~ is used. This processing apparatus 22 is provided with two or more transporting rollers 23 ~~used for~~ transporting the continuous sheet 21 along a transport path in parallel  
15 to the turn-up line A, a leg cutter 24 placed on the upstream side of the transport path, a printing device 25 placed on the downstream side of the leg cutter 24 and a turn-up unit 26 placed on the downstream side of this printing device 25.

20 The leg cutter 24 is designed so as to open positions corresponding to the leg-holes S in the continuous sheet 21 which has been transported.

The printing device 25 is provided with a nozzle 25a which discharges ink in accordance with a  
25 predetermined printing pattern, and a drying device 25b

which dries ink on the downstream side of this nozzle 25a, and intermittently prints display parts 20 on the outer sheet 5 at positions corresponding to the turn-up line A of the continuous sheet 21 in which the leg-hole sections S have been formed by the leg cutter 24.

The turn-up unit 26, which is omitted from this figure, is provided with a mechanism which turns up the continuous sheet 21 along the turn-up line A.

The continuous sheet 21 processed by the processing device 22 is then joined to one another at both side edges 1a as described above, and then cut into individual diaper main bodies 2 along the cut-line B.

As the inner sheet 4, there can be used a water-repellant non-woven fabric material (span-bond non-woven fabric, melt-blow non-woven fabric, SMS non-woven fabric, or the like). Preferably, ~~used is~~ a water-repellant non-woven fabric material with a METSUKU (basis weight per unit area) of 10 to 25 g/m<sup>2</sup> is used. Moreover, only the inner face may be subjected to hydrophilic treatment [coated with a surfactant, or a layer of hydrophilic fibers (rayon, cotton, or the like) is formed thereon], and this treatment provides better feelings ~~when brought into~~ in contacting with the skin, and improves the sweat absorbing effects.

As the outer sheet 5, there can be used a



water-repellant non-woven fabric material (span-bond non-woven fabric, melt-blow non-woven fabric, SMS non-woven fabric, or the like). Preferably, ~~used is~~ a water-repellant non-woven fabric material with a  
5 METSUKU (basis weight per unit area) of 10 to 25 g/m<sup>2</sup> is used.

The above-described absorbent main body 3, ~~as shown in Figs. 4 and 6,~~ is formed by sandwiching an absorbent core 13 having an approximately sandglass shape wrapped  
10 with a coating sheet 12, between a top sheet 10 and a back sheet 11, and is extended and placed in the diaper length direction X, as shown in Figs. 4 and 6.

To both sides of the inner face (top face) of the top sheet 10 of the above-described absorbent main body  
15 3, base ends 15a of rising flaps 15 which are extended and placed in the diaper length direction X are respectively bonded, and the rising flaps 15 are raised upward so that their upper ends are turned up inwardly. The rising flaps 15 are provided with flap elastic  
20 members 16 being which are attached and placed within the turned-up portion in an extended state in the diaper length direction X, so that the rising flaps 15 are allowed to rise. The inner faces of the front and rear ends of the rising flap 15 are bonded to the top sheet  
25 10 in a fallen state.

Between the coating sheet 12 and the absorbent core 13 of the above-described absorbent main body 3, two or more crotch elastic members 17 are attached and placed on the absorbent core 13 in an extended state in the length direction X with predetermined intervals over the entire width in the diaper width direction W.

The absorbent core 13 of the above-described absorbent main body 3 is bonded to the top sheet 10 and the back sheet 11 over the almost entire face thereof using a hot-melt adhesive or the like, and the back sheet 11 is bonded to the inner sheet 4 of the crotch portion R of the above-described diaper main body 2 over the almost entire face using a hot-melt adhesive or the like.

The absorbent core 13 is formed through the following processes: a material prepared by mixing particle-shaped polymer absorbent material into a hydrophilic fiber aggregate layer made of pulverized pulp fibers, cellulose fibers, or the like, is wrapped with a coating sheet 12 including a paper sheet such as tissue paper or a liquid permeable non-woven fabric sheet, and this wrapped material is formed into a predetermined shape (a rectangular shape, a sandglass shape, a gourd shape, or the like). This wrapped material may be prepared by shaping a sheet-shaped body (for example, air-laid absorbent body) or the like, which

is obtained by forming the above-described fibers and polymer absorbent body into a sheet shape, into a predetermined form. Moreover, in order to maintain the shape even when the wearer walks or changes the sides while sleeping, a shape-retaining means (application of a hot-melt adhesive, or mixing of synthetic fibers) may be placed in the hydrophilic fiber aggregated layer or sheet.

The top sheet 10 may be preferably ~~be~~ made of a liquid permeable non-woven fabric material. For example, there can be used a non-woven fabric material using hydrophilic fibers (cellulose, rayon, cotton, or the like), or a non-woven fabric material in which the surfaces of hydrophobic fibers (polypropylene, polyester, polyamide, nylon, or the like) are treated by a surfactant to be made liquid permeable. Preferably, ~~used are non-woven fabric materials (point-bond non-woven fabric, air through non-woven fabric, and the like),~~ in which one of the surfaces of hydrophobic fibers having a METSUKU (basis weight per unit area) of 10 to 25 g/m<sup>2</sup> is treated by a surfactant to be made liquid permeable, are used.

As the back sheet 11, there can be used a water repellent non-woven fabric material (span-bond non-woven fabric, melt-blow non-woven fabric, SMS

non-woven fabric, or the like), a plastic film (which may be either gas-permeable or gas-impermeable, and may desirably be a gas-permeable plastic film as a preferred embodiment), or their composite materials. Preferably,  
5 ~~used is a~~ gas-permeable polyethylene film having a METSUKU (basis weight per unit area) of 15 to 40 g/m<sup>2</sup> is used.

As the rising flap 15, there can be used a water repellent non-woven fabric material (span-bond  
10 non-woven fabric, melt-blow non-woven fabric, SMS non-woven fabric, or the like). Preferably, ~~used is~~ a water repellent non-woven fabric material with a METSUKU (basis weight per unit area) of 10 to 25 g/m<sup>2</sup> is used.

15 As the coating sheet 12, there can be used a paper sheet such as tissue paper or a liquid-permeable non-woven fabric sheet.

As the respective elastic members 6 to 8, 16, and 17, there can be used elastic expansion materials  
20 (polyurethane yarns, polyurethane films, natural rubbers, or the like), which are generally used ~~as in~~ disposable diapers, and each of these members is attached and placed between the respective sheet materials in an extended state using an appropriate attaching means  
25 such as a hot-melt adhesive, thermal joining, or

ultrasonic joining. Preferably, ~~used is a~~ rubber-type hot-melt adhesive is used.

As the waist elastic member 6, a polyurethane yarn having a size of 700 to 2,000 dtex may be preferably  
5 ~~be~~-attached and formed in an extended state with a magnification of 2.0 to 5.0 times.

As the body fit elastic member 7, a polyurethane yarn having a size of 300 to 1,000 dtex may be preferably  
~~be~~-attached and formed in an extended state with a  
10 magnification of 1.1 to 5.0 times.

As the leg-hole elastic member 8, a polyurethane yarn having a size of 700 to 2,000 dtex may be preferably  
~~be~~-attached and formed in an extended state with a magnification of 1.1 to 3.0 times.

15 As the flap elastic member 16, a polyurethane yarn having a size of 300 to 2,000 dtex may be preferably  
~~be~~-attached and formed in an extended state with a magnification of 1.1 to 4.0 times.

As the crotch elastic member 17, a polyurethane  
20 yarn having a size of 300 to 2,000 dtex may be preferably  
~~be~~-attached and formed in an extended state with a magnification of 1.1 to 4.0 times.

The joining process of each of the sheet materials may be appropriately ~~be~~-carried out using a method such  
25 as a hot-melt adhesive, thermal joining, or ultrasonic

joining. The hot-melt adhesive may be appropriately  
~~be~~ selected from hot-melt adhesives such as those of  
the rubber type, the polyolefin type, the vinyl acetate  
type, or the like, and may be applied using a method  
5 such as direct coater application, indirect spiral  
coating, melt-blow (curtain-spraying) coating, and  
bead coating. The side edges 1a may be preferably ~~be~~  
formed by thermal joining.

In the above-described embodiment, the size is  
10 displayed as identification information for the display  
part 20; however, the present invention is not limited  
to this arrangement, but there may be displayed, for  
example, a pattern such as used for indicating the front  
or back side of the diaper main body 2, as shown in Fig.  
15 7 (in the present embodiment, "▲" mark indicating the  
front abdomen P side is used for the display part 20).  
In the present embodiment, the characters "M" indicating  
the size and the marks "▲" indicating the side are  
alternately arranged along the diaper width direction.

20 Moreover, in the above-described embodiment, the  
character on the display part 20 is printed in such a  
direction as to be read when the diaper main body 2 is  
placed with the front abdomen portion P facing up;  
however, the direction of the character on the display  
25 part 20 is not limited to this arrangement, but it may

be printed, for example, in such a manner as to be read when the diaper main body 2 is placed with the back portion Q facing up.

Further, in the above-described embodiment, the leg-hole elastic member 8 is not attached and placed on a part corresponding to the formation position of the display part 20 in the diaper length direction X; however, the present invention is not limited to this arrangement. For example, the leg-hole elastic member 8 may be attached and placed along the entire circumference of the leg-hole portion 20, and the middle portion of the leg-hole elastic member 8 corresponding to the display part 20 in the diaper length direction X may be cut so that the elastic force may be reduced.

Moreover, in the above described respective embodiments, the display part 20 is formed on the outer sheet 5 at a position corresponding to the turn-up line A of the crotch portion R; however, the present invention is not limited to this arrangement, but the display part 20 may be formed, for example, on the folded outside part of the diaper main body 2 which has been folded so as to be placed into a packaging bag.

More specifically, ~~in order to~~ for the purpose of ~~place~~ placing the pants-type diaper 1 into a packaging bag, ~~as shown in Fig. 8(a),~~ both side edges 1a of the

diaper main body 2 are folded inward along a pair of turn-up lines C which extend along the diaper length direction X on both sides of the absorbent main body 3 as shown in Fig. 8(a), and, ~~as shown in Fig. 8(b)~~,  
5 the lower end of the diaper main body 2 may be folded along a turn-up line D in a manner so as to cover the folded both side edges 1a as shown in Fig. 8(b). Thus, the diaper main body 2 is folded into an approximately square shape when seen in a plan view, as shown in Fig.  
10 8(c). With respect to the diaper main body 2 folded in this manner, a display part 20a (in the present embodiment, size "S" is shown) may be formed on the outside part which has been turned up along a turn-up line D, as shown in Fig. 10(a). In such a folded state,  
15 in place of the display part 20a, or in addition thereto, a display part may be formed on the outside part which has been turned up along a turn-up line C.

Moreover, in the case when the pants-type diaper 1 is placed into a packaging bag, after both side edges 1a have been folded along the two turn-up lines C, as  
20 shown in Fig. 9(a), the diaper main body 2 may be folded along a turn-up line E extending along the diaper width direction W at a position lower than the turn-up line D as shown in Fig. 9(b), and in this state, the diaper  
25 main body 2 may be folded into upper and lower half



portions along a turn-up line F ~~shown in Fig. 9(b)~~ in a manner so as to make the positions of the lower end (turn-up line E) and the upper end (waist opening) coincident with each other as shown in Fig. 9(c); thus,   
5 ~~as shown in Fig. 9(e)~~, the diaper main body 2 is folded into an approximately rectangular shape when seen in a plan view, as shown in Fig. 9(c). With respect to the diaper main body 2 folded in this manner, ~~as shown in Fig. 10(b)~~, a display part 20b (in the present   
10 embodiment, size "L" is shown) may be formed on the outside part which has been turned up along a turn-up line F as shown in Fig. 10(b). In such a folded state, in place of the display part 20b, or in addition thereto, a display part may be formed on the outside part which   
15 has been turned up along turn-up lines C and E.

Further, in the above-described respective embodiments, each of the display parts 20, 20a, and 20b is formed only on the outside part of the turned-up sheet; however, there present invention is not limited to this   
20 arrangement, but for example, ~~as shown in Fig. 11~~, the display part 20 may be extended to the front abdomen portion P of the diaper main body 2, that is, the display information of the display part 20 may be displayed also on the front abdomen portion P, as shown in Fig. 11.   
25 The extended portion of the display part 20 is not limited

to the front abdomen portion P, and the display part 20 may be formed on the back portion Q, or the display part 20 may be formed on both the front abdomen portion P and the back portion Q.

5           As described above, according to the pants-type disposable diaper 1, when two or more diaper main bodies 2 are stacked on one another, each of these display parts 20, 20a, and 20b can be recognized from a side position of each of the diaper main bodies 2 so that the size  
10 and the front or back side of the diaper main body 2 can be recognized in the stacked state of the diaper main bodies 2. Moreover, by confirming each of the display parts 20, 20a, and 20b in wearing a pants-type diaper, the wearer is allowed to wear a proper pants-type  
15 diaper 1, without erroneously recognizing the size and the front or back side of the diaper main body 2.

          In the case when the display part 20 is designed so as to be formed on the outside part of the outer sheet  
5 turned up along the crotch portion R, it becomes  
20 possible to recognize the size and the front or back side of each of the diaper main bodies 2 which are stacked with the crotch portion R facing sideward. Moreover, since the display part 20 is placed the outside part of the folded crotch portion R, that is, since the display  
25 part 20 is placed between the thighs of the wearer, the

display part 20 is made less conspicuous comparatively when the diaper is used.

~~With the arrangement that~~ In the case that the  
display part 20 is extended over both the front abdomen  
5 portion P and the back portion Q, for example, when two  
or more diaper main bodies 2 are stacked with respect  
to each of the sizes (see Fig. 11), ~~by confirming the~~  
~~diaper main body 2 placed on the top of the stack from~~  
~~above,~~ the size of the stack of the diaper main bodies  
10 2 can be recognized by confirming the diaper main body  
2 placed on the top of the stack from above.

In the case when the display part 20 is designed  
so as to be extended toward the front abdomen portion  
P, ~~in wearing a pants-type diaper,~~ the extended side  
15 of the display part 20 can be recognized as the front  
side of the diaper main body 2 in wearing a pants-type  
diaper.

In the case when the display part 20 is designed  
so as to be extended toward the back portion Q, ~~in wearing~~  
20 ~~a pants-type diaper,~~ the extended side of the display  
part 20 can be recognized as the back side of the diaper  
main body 2 in wearing a pants-type diaper.

According to the arrangement in which the leg-hole  
elastic members 8 are not placed at a position having  
25 the display part 20 between the two leg-holes portions

S, since this makes it possible to prevent identification information displayed on the display part 20 from shrinking due to an elastic force of the leg-hole elastic members 8, the display part 20 formed on the crotch portion R can more clearly be displayed.

According to the arrangement in which the display parts 20a and 20b are formed on the folded outside parts of the diaper main body 2 which has been folded so as to be placed in a packaging bag, even when the diaper main bodies 2 placed in packaging bags are taken out and stacked as they are, the identification information of the diaper main bodies 2 can be recognized.

By printing the display parts 20, 20a, and 20b by means of an ink-jet system, the display parts 20, 20a, and 20b can be formed by a comparatively easy method, and at the same time, the contents of identification information can comparatively easily be changed.

Moreover, for producing pants-type disposable diapers 1, a continuous sheet 21 composed of two or more inner sheets 4 and two or more outer sheets 5, respectively, forming the front abdomen portions P and the back portions P, which inner sheets and outer sheets are joined to each other in parallel to a turn-up line A, is transported in a direction parallel to the turn-up line A, and after opening positions corresponding to

leg-hole sections S of the continuous sheet 21, a display part 20 indicating identification information of the diaper main body 2 is intermittently printed on the outer sheet 5 in the vicinity of the turn-up line A in the sheet with openings, by means of an ink-jet system. For this reason, in comparison with the arrangement in which display parts 20 are continuously printed along the turn-up line A of a continuous sheet without openings for the leg-hole sections S, and then leg-hole sections S are made, the amount of ink required for printing the positions of the continuous sheet 21 corresponding to the leg-hole sections S can be reduced, thereby making it possible to reduce the costs of the pants-type disposable diaper 1.

In the above-described embodiment, the display parts 20, 20a, and 20b are employed for the pants-type disposable diaper 1 in which the absorbent main body 3 is bonded to the inner sheet 4; however, in place of this arrangement, the display parts 20, 20a, and 20b may be applied to a pants-type disposable diaper in which the absorbent main body 3 is disposed between the inner sheet 4 and the outer sheet 5.

#### ~~INDUSTRIAL APPLICABILITY~~

The pants-type disposable diaper of the present

invention allows its display part that displays identification information including the size and the front or back side of the diaper, and the like, to become easily recognizable from a side position of each of the  
5 diaper main bodies, even when two or more diapers are stacked on one another and stored. Therefore, this arrangement allows employees in the nursing-care facilities or the like where pants-type diapers of two or more kinds are daily used to promptly recognize the  
10 identification information, ~~even when two or more pants-type diapers, which have been taken out of packaging bags, stacked on one another, and stored, and~~ consequently to readily take out a pants-type diaper having a required size, even when two or more pants-type  
15 diapers, which have been taken out of packaging bags, are stacked on one another and stored.

## ABSTRACT OF THE DISCLOSURE

A pants-type disposable diaper  $[[1]]$  including an absorbent main body and a diaper main body  $[[2]]$  having  
5 a front abdomen portion  $[[P]]$ , a back portion  $[[Q]]$ ,  
and leg hole sections  $[[S]]$  which are formed on both  
sides of a crotch portion  $[[R]]$  between the front abdomen  
portion and the back portion, ~~these portions, and~~  
~~further having a waist opening which is formed by joining~~  
10 ~~each of both side edges of the front abdomen portion~~  
~~to corresponding each one of both side edges of the back~~  
~~portion, with the crotch portion being provided with~~  
~~an absorbent main body 3, in which waist elastic members~~  
~~6 are attached in an expanded state in a diaper width~~  
15 ~~direction to parts of the front abdomen portion and to~~  
~~parts of the back portion, both of which parts are~~  
~~corresponding to the waist opening, with each of the~~  
~~leg hole sections being provided with a leg hole elastic~~  
~~member 8 which is attached in an expanded state along~~  
20 ~~the leg hole,~~ wherein the diaper main body  $[[2]]$  is  
provided with a display part  $[[20]]$  which displays  
identification information including a size of the  
diaper main body and a front or back side of the diaper  
main body, ~~and the like,~~ so as to allow the display part  
25 ~~to become recognizable~~ be visible from a side position

of each of diaper main bodies, when two or more diaper  
main bodies are stacked on one another ~~with~~ so that the  
front abdomen portion of one diaper main body ~~being~~ is  
overlapped with the back portion of another diaper main  
5 body. ~~This structure makes it possible to easily~~  
~~recognize, even when the diaper main bodies 2 are in~~  
~~a staked state, the identification information.~~